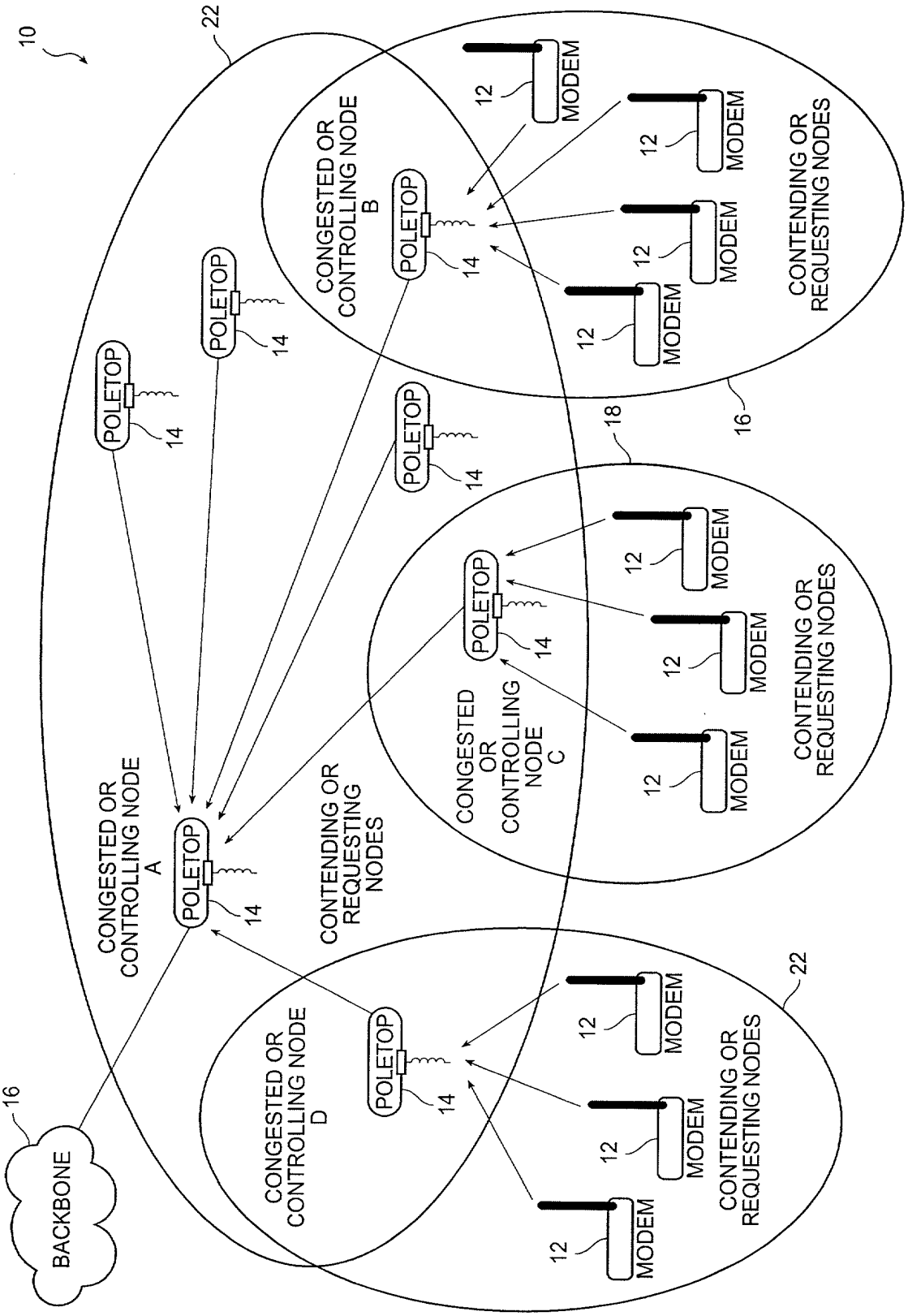
10
22
BACKBONE
16
CONGESTED OR CONTROLLING NODE A
POLETOP
14
CONTENDING OR REQUESTING NODES
CONGESTED OR CONTROLLING NODE B
CONTENDING OR REQUESTING NODES
16
18
CONGESTED OR CONTROLLING NODE C
CONTENDING OR REQUESTING NODES
CONGESTED OR CONTROLLING NODE D
CONTENDING OR REQUESTING NODES
12
MODEM

FIG. 1

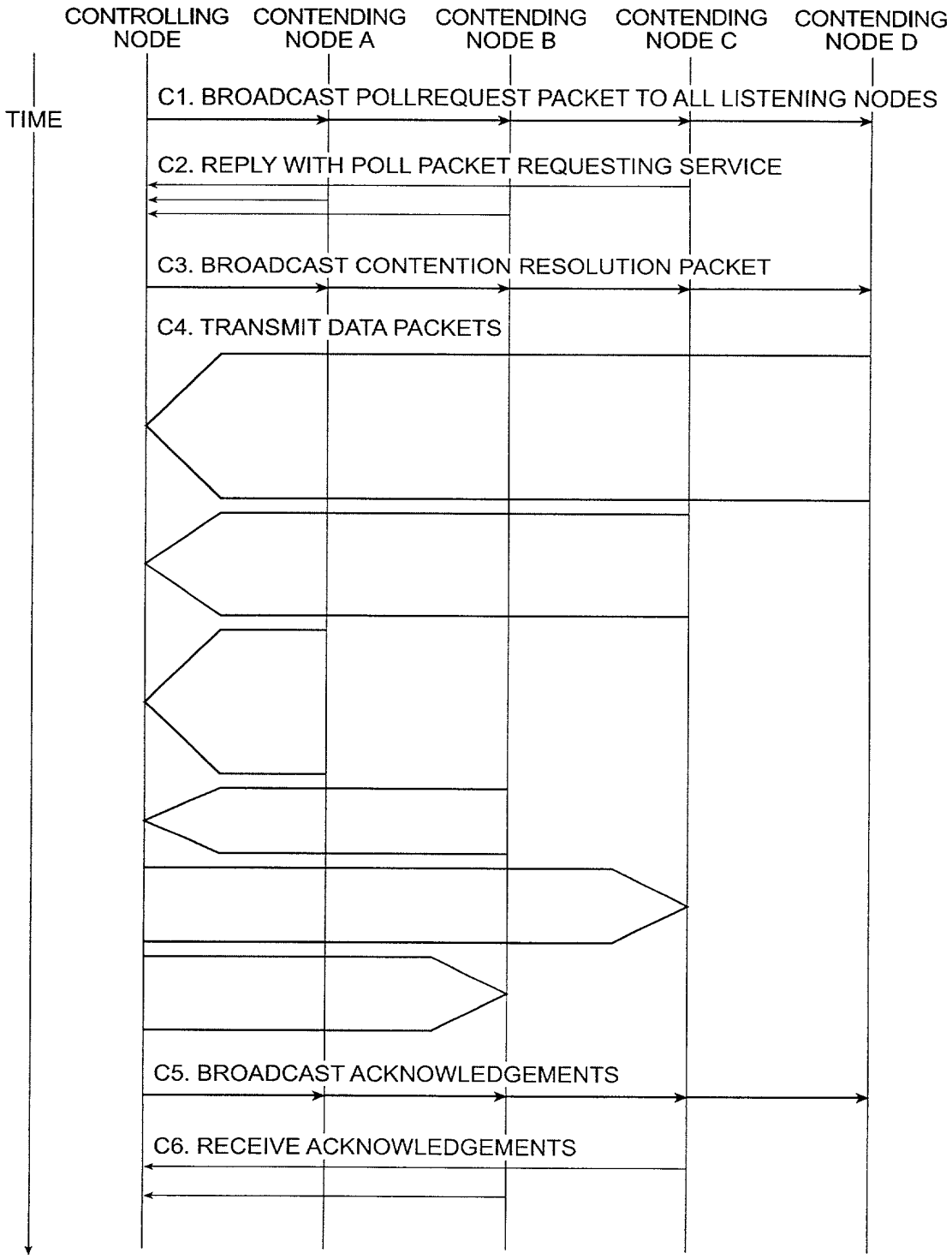
CONTROLLING NODE
CONTENDING NODE A
CONTENDING NODE B
CONTENDING NODE C
CONTENDING NODE D
TIME
C1. BROADCAST POLLREQUEST PACKET TO ALL LISTENING NODES
C2. REPLY WITH POLL PACKET REQUESTING SERVICE
C3. BROADCAST CONTENTION RESOLUTION PACKET
C4. TRANSMIT DATA PACKETS
C5. BROADCAST ACKNOWLEDGEMENTS
C6. RECEIVE ACKNOWLEDGEMENTS

FIG. 2

BROADCAST POLLREQUEST PACKET

SOURCE MAC ADDRESS
NUMBER OF CONTENTION MINI-SLOTS
NUMBER OF RESERVED MINI-SLOTS
LOAD ADVERTISEMENT

FIG. 3A

POLL PACKET

	DESTINATION MAC ADDRESS
	SOURCE MAC ADDRESS
	NUMBER OF CLASSES OF DATA
LIST OF DATA CLASSES / REQUESTOR'S FIRST DATA CLASS	FIRST CLASS (PRIORITY) OF PACKETS
	TOTAL AMOUNT OF DATA TO SEND
	AMOUNT OF DATA TO SEND IN NEXT PACKET
REQUESTOR'S SECOND DATA CLASS	SECOND CLASS (PRIORITY) OF PACKETS
	TOTAL AMOUNT OF DATA TO SEND
	AMOUNT OF DATA TO SEND IN NEXT PACKET
ETC.	⋮ ⋮
REQUESTOR'S LAST DATA CLASS	LAST CLASS (PRIORITY) OF PACKETS
	TOTAL AMOUNT OF DATA TO SEND
	AMOUNT OF DATA TO SEND IN NEXT PACKET

FIG. 3B

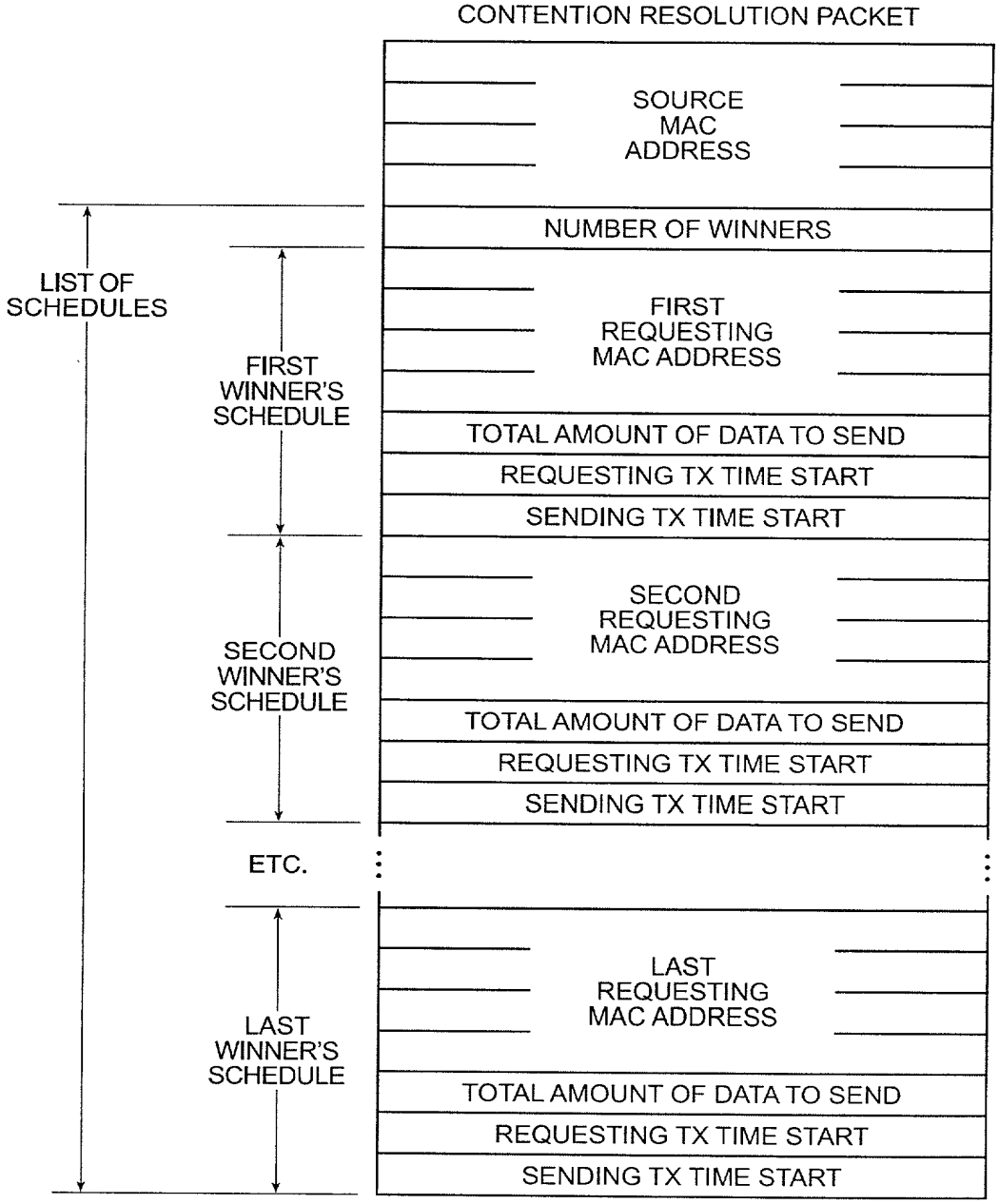
CONTENTION RESOLUTION PACKET
SOURCE MAC ADDRESS
NUMBER OF WINNERS
LIST OF SCHEDULES
FIRST WINNER'S SCHEDULE
FIRST REQUESTING MAC ADDRESS
TOTAL AMOUNT OF DATA TO SEND
REQUESTING TX TIME START
SENDING TX TIME START
SECOND WINNER'S SCHEDULE
SECOND REQUESTING MAC ADDRESS
TOTAL AMOUNT OF DATA TO SEND
REQUESTING TX TIME START
SENDING TX TIME START
ETC.
LAST WINNER'S SCHEDULE
LAST REQUESTING MAC ADDRESS
TOTAL AMOUNT OF DATA TO SEND
REQUESTING TX TIME START
SENDING TX TIME START

FIG. 3C

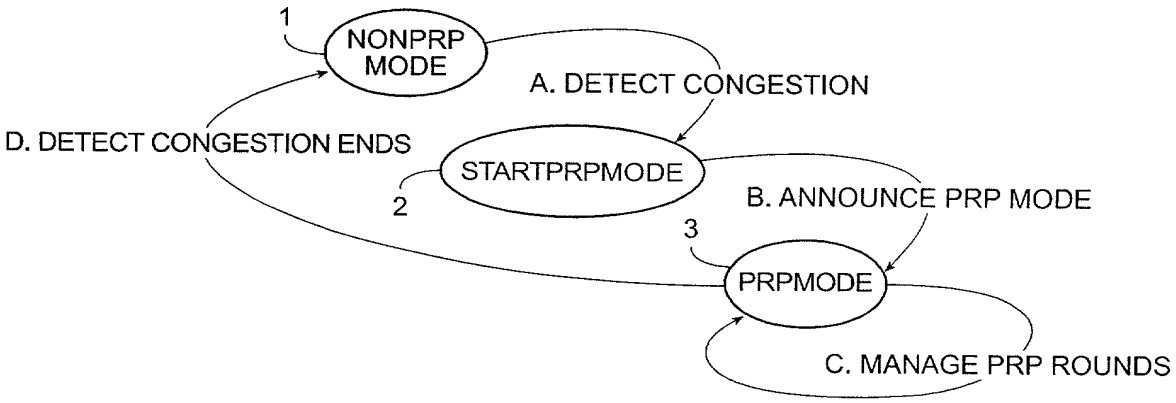
1
NONPRP MODE
A. DETECT CONGESTION
D. DETECT CONGESTION ENDS
STARTPRPMODE
2
B. ANNOUNCE PRP MODE
3
PRPMODE
C. MANAGE PRP ROUNDS

FIG. 4

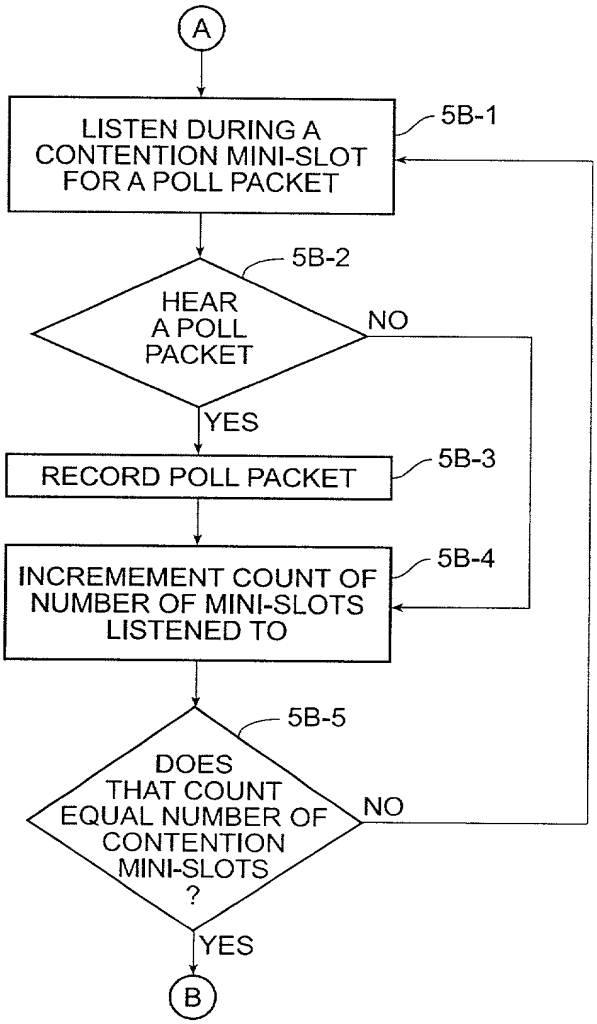
A
LISTEN DURING A CONTENTION MINI-SLOT FOR A POLL PACKET
5B-1
5B-2
HEAR A POLL PACKET
NO
YES
RECORD POLL PACKET
5B-3
INCREMEMENT COUNT OF NUMBER OF MINI-SLOTS LISTENED TO
5B-4
5B-5
DOES THAT COUNT EQUAL NUMBER OF CONTENTION MINI-SLOTS ?
NO
YES
B

FIG. 5B

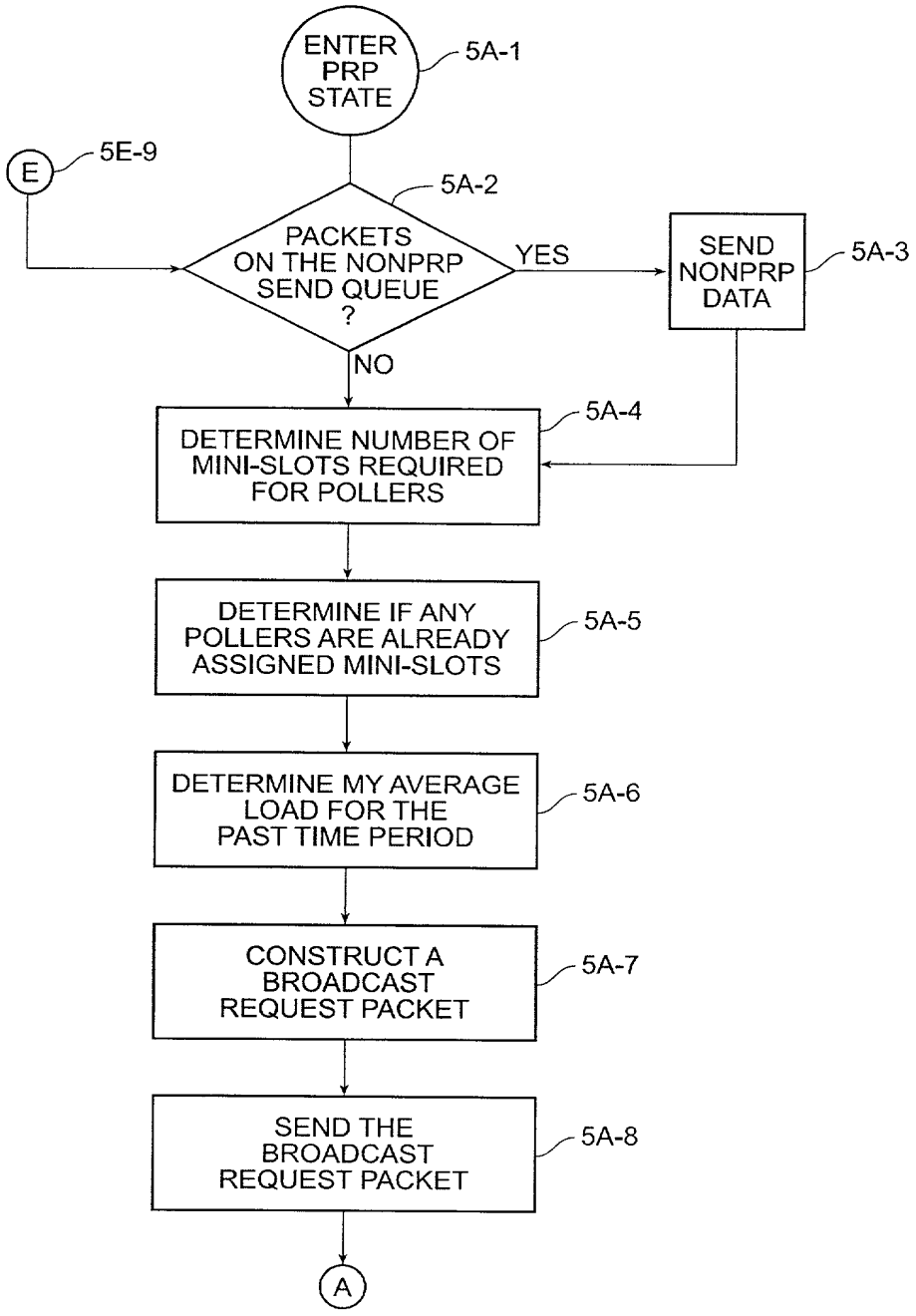
ENTER PRP STATE
5A-1
E
5E-9
5A-2
PACKETS ON THE NONPRP SEND QUEUE ?
YES
SEND NONPRP DATA
5A-3
NO
DETERMINE NUMBER OF MINI-SLOTS REQUIRED FOR POLLERS
5A-4
DETERMINE IF ANY POLLERS ARE ALREADY ASSIGNED MINI-SLOTS
5A-5
DETERMINE MY AVERAGE LOAD FOR THE PAST TIME PERIOD
5A-6
CONSTRUCT A BROADCAST REQUEST PACKET
5A-7
SEND THE BROADCAST REQUEST PACKET
5A-8
A

FIG. 5A

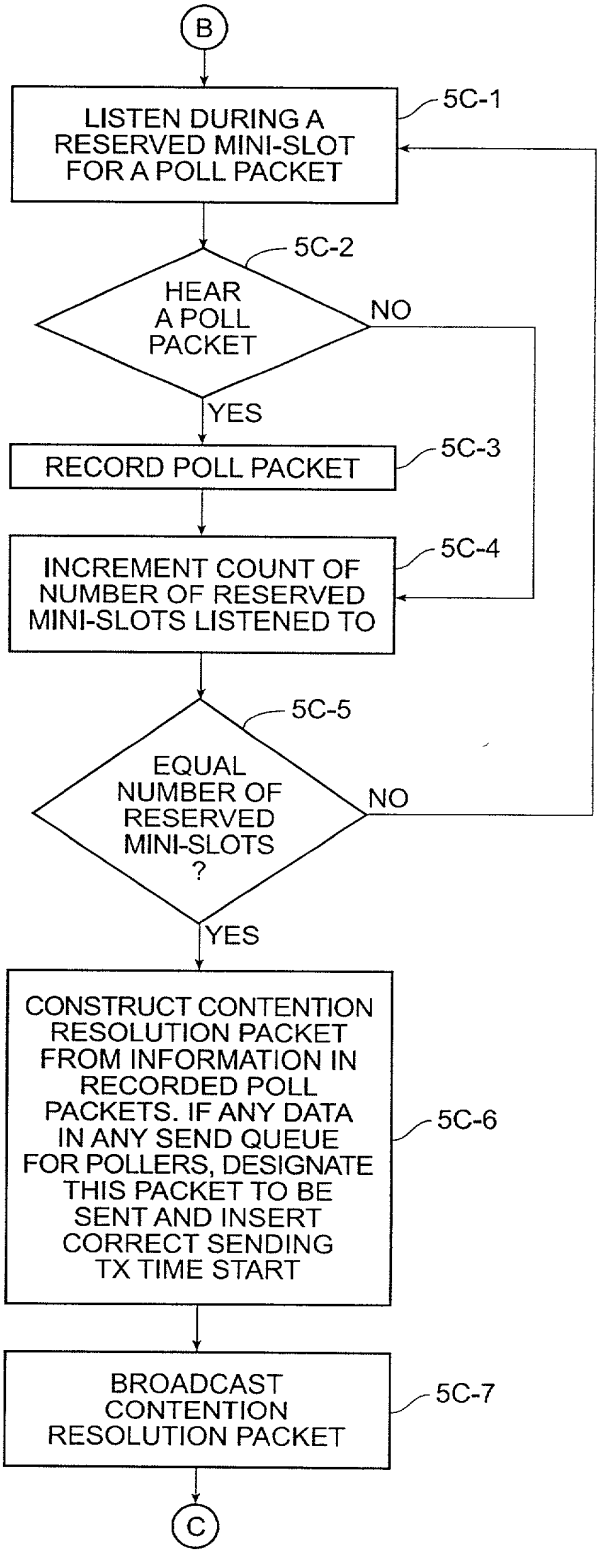

FIG. 5C

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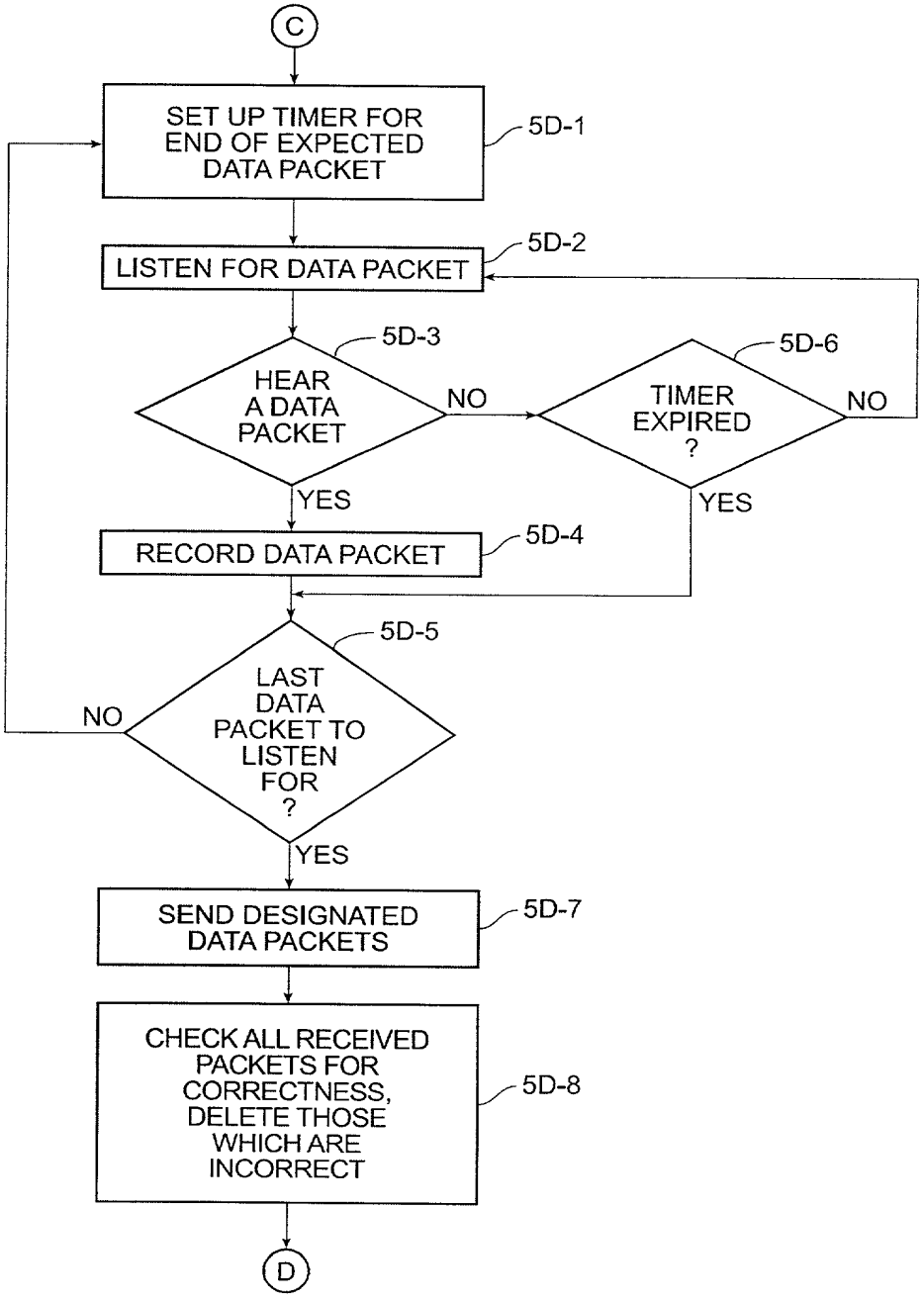
C
SET UP TIMER FOR END OF EXPECTED DATA PACKET
5D-1
LISTEN FOR DATA PACKET
5D-2
HEAR A DATA PACKET
5D-3
NO
TIMER EXPIRED ?
5D-6
NO
YES
YES
RECORD DATA PACKET
5D-4
LAST DATA PACKET TO LISTEN FOR ?
5D-5
NO
YES
SEND DESIGNATED DATA PACKETS
5D-7
CHECK ALL RECEIVED PACKETS FOR CORRECTNESS, DELETE THOSE WHICH ARE INCORRECT
5D-8
D

FIG. 5D

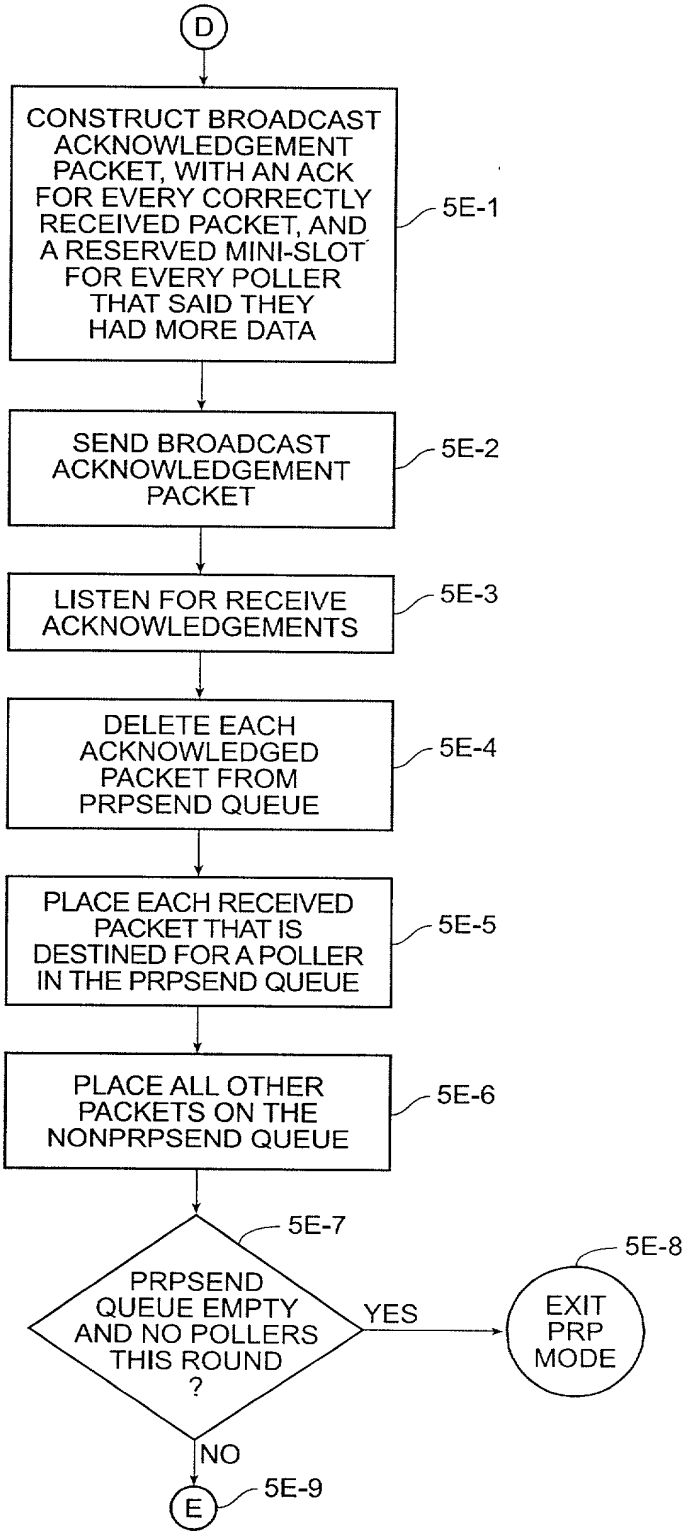
D
CONSTRUCT BROADCAST ACKNOWLEDGEMENT PACKET, WITH AN ACK FOR EVERY CORRECTLY RECEIVED PACKET, AND A RESERVED MINI-SLOT FOR EVERY POLLER THAT SAID THEY HAD MORE DATA
5E-1
SEND BROADCAST ACKNOWLEDGEMENT PACKET
5E-2
LISTEN FOR RECEIVE ACKNOWLEDGEMENTS
5E-3
DELETE EACH ACKNOWLEDGED PACKET FROM PRPSEND QUEUE
5E-4
PLACE EACH RECEIVED PACKET THAT IS DESTINED FOR A POLLER IN THE PRPSEND QUEUE
5E-5
PLACE ALL OTHER PACKETS ON THE NONPRPSEND QUEUE
5E-6
5E-7
PRPSEND QUEUE EMPTY AND NO POLLERS THIS ROUND ?
YES
5E-8
EXIT PRP MODE
NO
E
5E-9

FIG. 5E

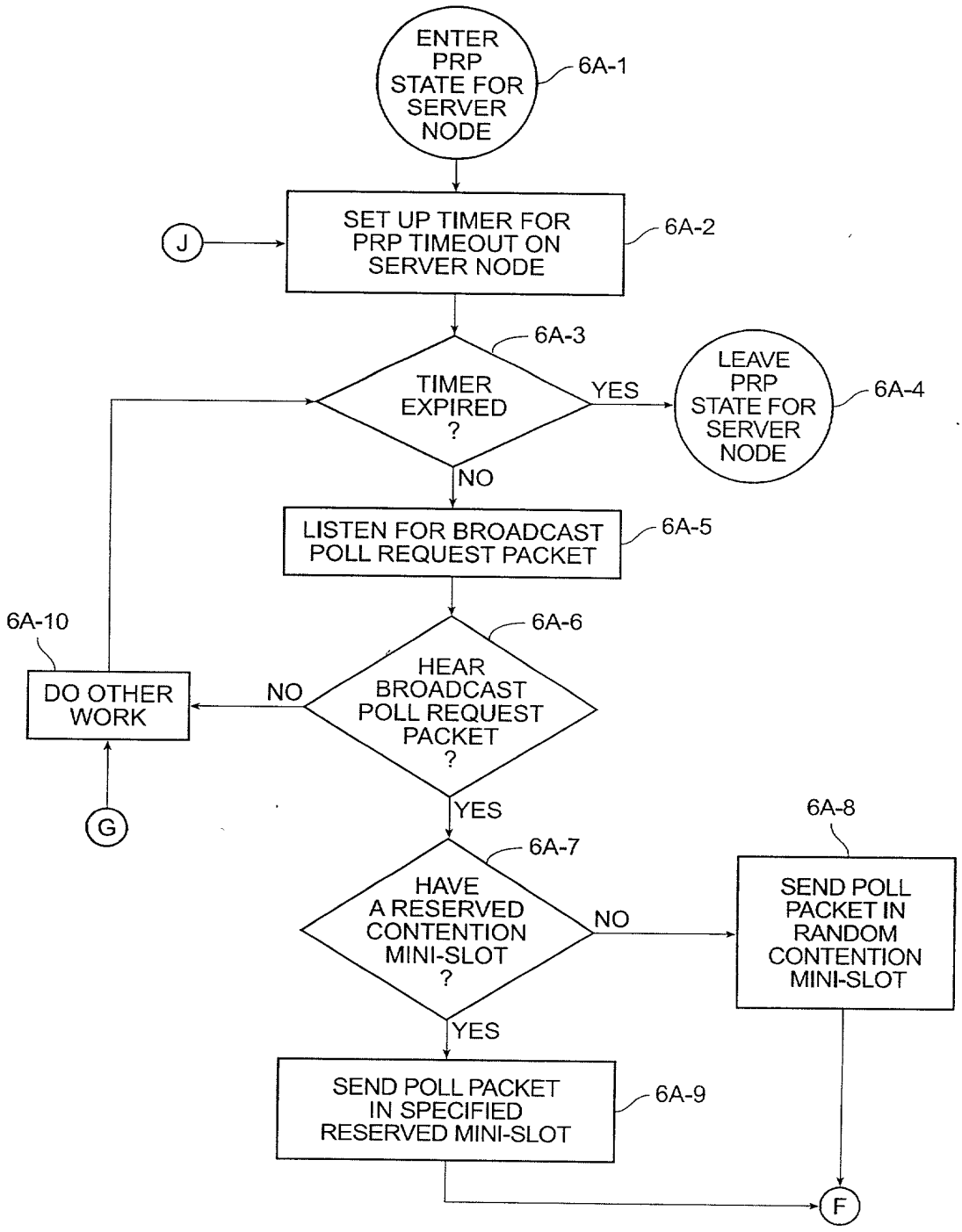
ENTER PRP STATE FOR SERVER NODE
6A-1
J
SET UP TIMER FOR PRP TIMEOUT ON SERVER NODE
6A-2
6A-3
TIMER EXPIRED ?
YES
LEAVE PRP STATE FOR SERVER NODE
6A-4
NO
LISTEN FOR BROADCAST POLL REQUEST PACKET
6A-5
6A-6
HEAR BROADCAST POLL REQUEST PACKET ?
NO
6A-10
DO OTHER WORK
G
YES
6A-7
HAVE A RESERVED CONTENTION MINI-SLOT ?
NO
6A-8
SEND POLL PACKET IN RANDOM CONTENTION MINI-SLOT
YES
SEND POLL PACKET IN SPECIFIED RESERVED MINI-SLOT
6A-9
F

FIG. 6A

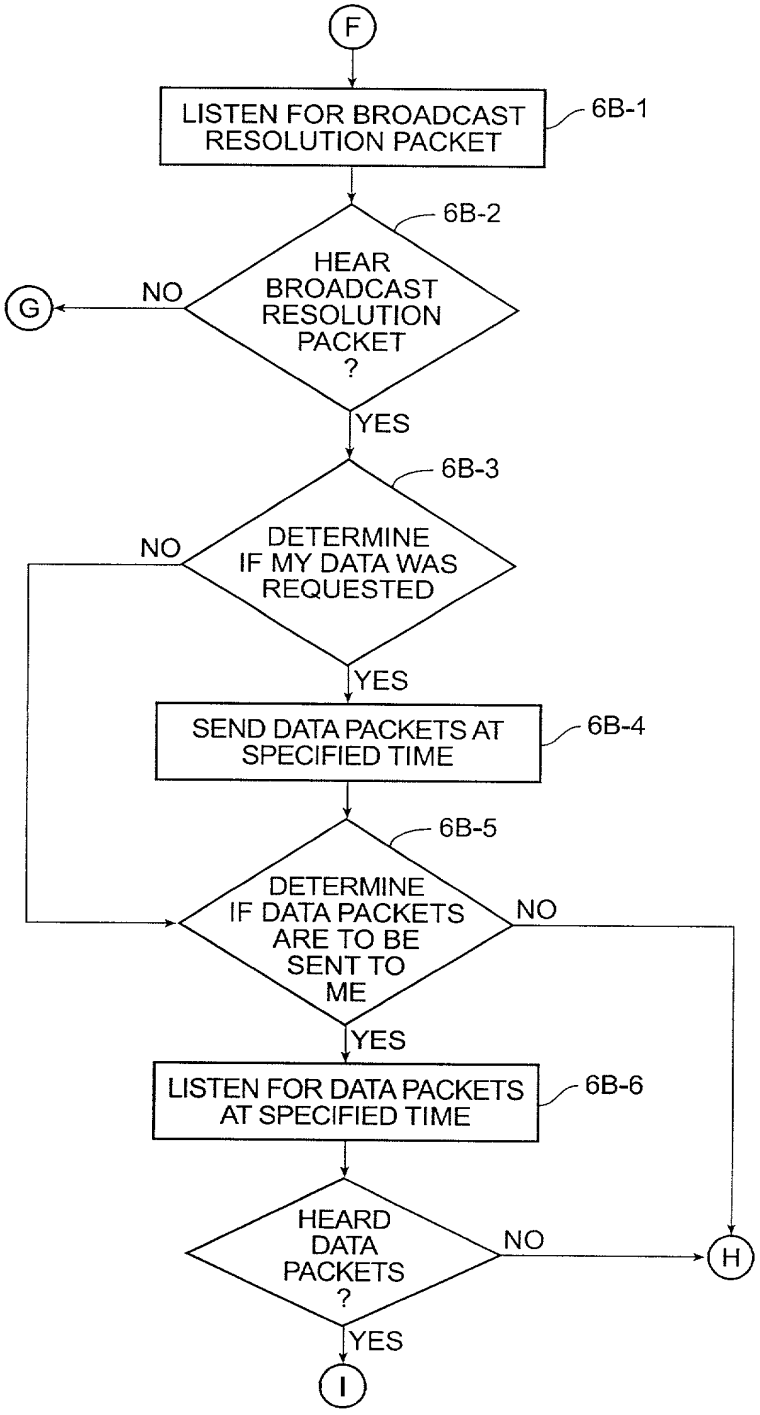
F
LISTEN FOR BROADCAST RESOLUTION PACKET
6B-1
6B-2
HEAR BROADCAST RESOLUTION PACKET ?
NO
G
YES
6B-3
DETERMINE IF MY DATA WAS REQUESTED
NO
YES
SEND DATA PACKETS AT SPECIFIED TIME
6B-4
6B-5
DETERMINE IF DATA PACKETS ARE TO BE SENT TO ME
NO
YES
LISTEN FOR DATA PACKETS AT SPECIFIED TIME
6B-6
HEARD DATA PACKETS ?
NO
H
YES
I

FIG. 6B

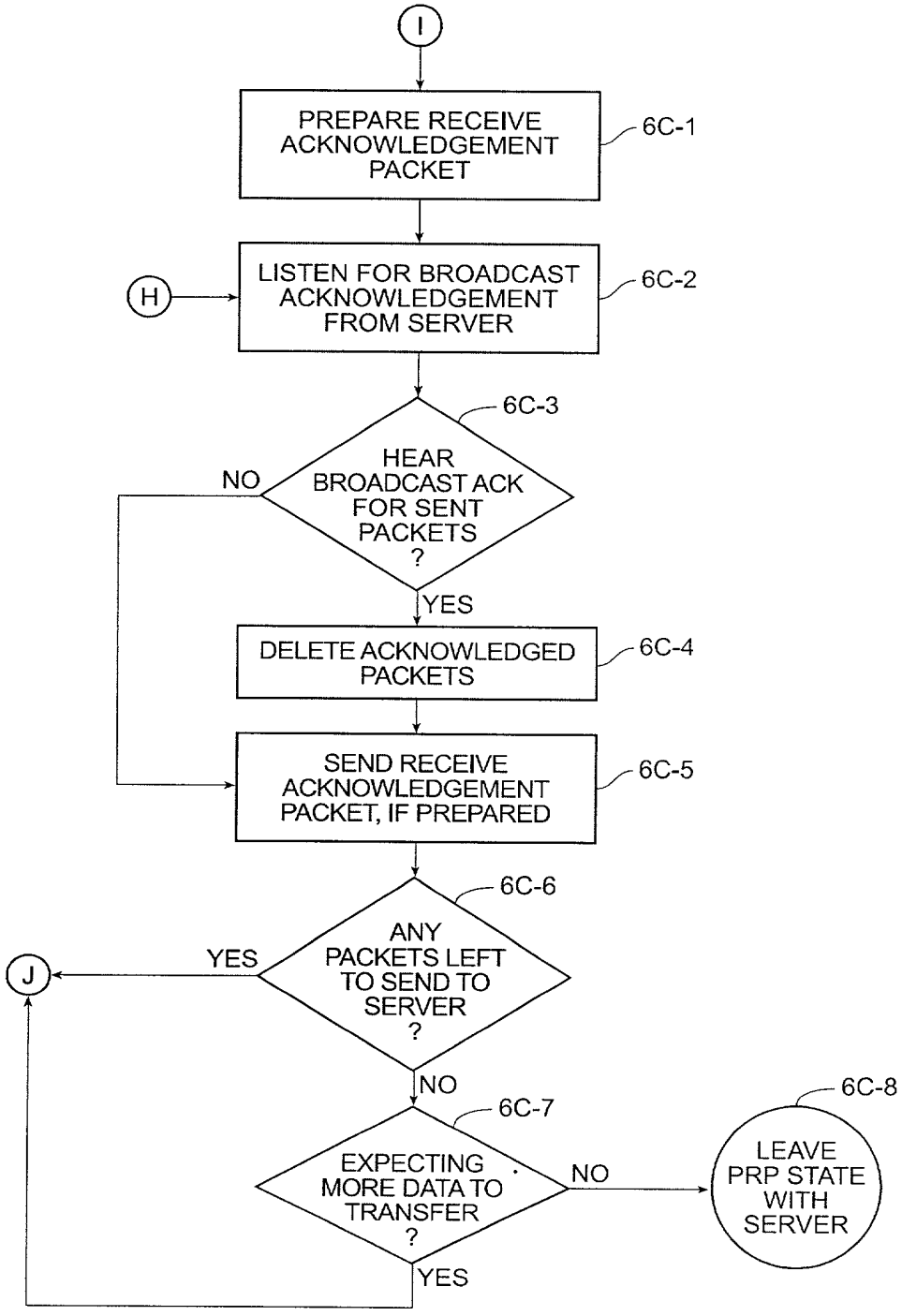
I
PREPARE RECEIVE ACKNOWLEDGEMENT PACKET
6C-1
H
LISTEN FOR BROADCAST ACKNOWLEDGEMENT FROM SERVER
6C-2
6C-3
HEAR BROADCAST ACK FOR SENT PACKETS ?
NO
YES
DELETE ACKNOWLEDGED PACKETS
6C-4
SEND RECEIVE ACKNOWLEDGEMENT PACKET, IF PREPARED
6C-5
6C-6
ANY PACKETS LEFT TO SEND TO SERVER ?
YES
J
NO
6C-7
EXPECTING MORE DATA TO TRANSFER ?
NO
6C-8
LEAVE PRP STATE WITH SERVER
YES

FIG. 6C